

LEARNING MATERIALS

Speed of light

Light travels very fast, but we can use a simple microwave oven to measure the speed of light. According to the electromagnetic theory, all electromagnetic waves travel at the speed of light, and this is a constant number (approximately 300,000 km/s in a vacuum).

Microwave ovens use electromagnetic waves for cooking, but the temperature varies according to the position of the wave. So, if we remove the rotation and operate the oven for a short time, we can see hot points on a chocolate bar. We then measure this distance and get the wavelength, and if we read the frequency off the label and use a relationship between these two parameters and the speed, we can calculate the speed of light.

Questions for testing comprehension:

(1) How would the separation of hot spots on chocolate change if we could somehow do this experiment in water? What about in a vacuum (no air)?

Further Reading and materials:

- (1) https://en.wikipedia.org/wiki/Speed_of_light
- (2) https://math.ucr.edu/home/baez/physics/Relativity/SpeedOfLight/measure_c.html
- (3) https://en.wikipedia.org/wiki/Microwave_oven